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Framework to Assess Performance and Impact of Pluralistic Agricultural Extension Systems

The Best-fit Framework Revisited

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Contents

Tables

Figures

Boxes

ABSTRACT

Extension and advisory services (EAS) are well recognized as a key factor in contributing to agricultural productivity and growth. However, rigorous evaluation of EAS approaches and assessment of complex national or subnational pluralistic EAS systems are rare. This working paper examines the literature on experiential and empirical insights and explores methods to assess complex pluralistic EAS systems. The authors present conceptual thinking on innovation systems and EAS, and review the IFPRI "best-fit" framework. This framework remains relevant because it is based on a holistic perspective with an impact pathway orientation. The paper aims to operationalize and improve the best-fit framework to guide the evaluation of complex EAS systems. The authors draw on and summarize existing literature to illustrate methods and tools used to analyze each component of the framework. The review pays close attention to the literature and methods for assessing the diversity of service providers and their various delivery tools and learning approaches. The discussion also pays close attention to the interaction of each component and how it affects the performance and impact of EAS from a systems perspective. This paper adds key points and considerations on how to operationalize the best-fit framework to carry out evaluations of pluralistic EAS.

Keywords: advisory services, extension, governance, funding, advisory method, evaluation

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1. INTRODUCTION

Extension and advisory services (EAS) have evolved in many ways in the past half-century (Leeuwis and Van den Ban 2004; Swanson 2008; Rivera 2008; Christoplos 2010; Cristovão, Koutsouris, and Kügler 2012; Faure, Desjeux, and Gasselin 2012). There has been a shift from solely public advisory services to pluralistic EAS with greater roles for private, nongovernmental, and community-based organizations. EAS providers today are diverse and pursue a variety of objectives. Another shift is the move from an agricultural production focus to a broader set of services focusing on income, market linkage, food and nutrition security, and improved well-being. A third shift has been an increased criticism of the transfer-of-technologies approach to a promotion of methods based on facilitation, learning processes, and increased capacity to innovate. However, in many countries, the linear approaches still dominate, as does the focus on production. Reasons for this include the tendency of public organizations to avoid change, difficulties in changing organizational behavior, and public policies that continue to concentrate on production.

Pluralistic EAS form a complex system embedded within an agricultural innovation system (AIS; Davis and Heemskerk 2012). We will explore this concept in greater depth in the following section. This complexity make the assessment of performance and impact of extension particularly challenging. Many evaluations of organizational performances of EAS and impacts at the project and program levels have been undertaken to learn from or justify the investments of international donors or governments. As this working paper illustrates, the existing literature is rich in research analyzing (1) the evolution of extension systems related to past and ongoing reforms, (2) the performance and impacts of specific programs or projects supporting advisory services, and (3) a particular delivery method or communication tool. However, only a few studies have addressed the evolution of the entire set of advisory service providers that make up the national and subnational EAS system, how they interact, and how this affects their performance and impact. There has been a lack of assessments to explore the link between organizational performance and impact (Martin, Gündel, and Apentang 2011).

Researchers must better assess the organizational performance and impact of these complex advisory systems. This research can inform recommendations for policy makers and practitioners to improve the system, identify key bottlenecks and challenges, and see where to scale out and scale up effective approaches. Many studies often focus on only one aspect of the system or analyze its components piecemeal. There is a dearth of research that (1) evaluates EAS from a systems perspective, (2) combines qualitative and quantitative methods, and (3) integrates a diagnostic characterization of the system with the evaluation of performance and impacts.

This paper examines the literature regarding the assessment of complex pluralistic EAS systems. In addition, it makes recommendations for how to operationalize the IFPRI "best-fit" framework (Birner et al. 2009) for designing and analyzing pluralistic EAS. This best-fit framework continues to be relevant because it is based on a holistic perspective and has an impact pathway orientation. However, some elements of the framework require refinement to make it more operational. The paper also aims to revisit the best-fit framework based on the existing literature. This framework helps assess the entire set of various service providers, their interactions, and the factors affecting their performance and impact within a systems perspective.

Section 1 defines EAS. Section 2 presents the conceptual thinking on innovation systems and EAS, and reviews the IFPRI best-fit framework. Section 3 presents current thinking on the performance of EAS which are explained by their different components (governance, funding, capacities of service providers, and advisory methods). Section 4 summarizes previous evaluations of service providers' performances and their impacts at the farm level and beyond. Section 5 outlines a simple methodology to operationalize the best-fit framework and evaluates pluralistic EAS systems. Section 6 draws conclusions and offers recommendations.

What Are Extension and Advisory Services?

There are many definitions of extension or advisory services, each of which reflect different visions of how to achieve agricultural development. Some definitions are presented in Box 1.1. Some experts relate EAS to: (1) an entire set of organizations; (2) a set of actions, activities, and interventions; and (3) a system in which various actors conduct activities in an attempt to solve a problem or achieve particular objectives. Farmers and other rural actors can benefit from numerous types of advisory services defined as much by their content (technical, economic, social, and environmental) as by the way they are provided (disseminating information and techniques, reinforcing the learning process, or accompanying actors). Different categories of public and private actors provide advisory services. Finally we consider that EAS include two elements: (1) actors who provide advice and characterized by their objectives, the relationships they maintain with one another and with other external actors; and (2) the content of the advice and the methods used by service providers to create knowledge and expertise in regard to individual and/or collective learning processes (Faure, Desjeux, and Gasselin 2012).

Box 1.1 Examples of definitions of extension and advisory services

For Birner et al. (2009, 342), "agricultural advisory services are defined as the entire set of organizations that support and facilitate people engaged in agricultural production to solve problems and to obtain information, skills, and technologies to improve their livelihoods and well-being." Although the ways to provide advice may be diverse, this definition focuses on the advice of those engaged in agricultural production, rather than broader advice that touches on market access, livelihoods, health, and nutrition.

Christoplos (2010, 3) uses another definition of extension, taken from the Food and Agriculture Organization (FAO) of the United Nations. "Extension is defined as systems that facilitate the access of farmers, their organizations, and other market actors to knowledge, information, and technologies; facilitate their interaction with partners in research, education, agri-business, and other relevant institutions; and assist them to develop their own technical, organizational, and management skills and practices." In this case, the definition focuses more on actors involved in value chains, which is in line with a more demand- and market-driven orientation regarding advisory services.

The definition of advisory services used by the Global Forum for Rural Advisory Services (GFRAS) is based on the practitioner's perspective (Sulaiman and Davis, 2012, 2): "Rural advisory services are the different activities that provide the information and services needed and demanded by farmers and other actors in rural settings to assist them in developing their own technical, organizational, and management skills and practices so as to improve their livelihoods and well-being. It recognizes the diversity of actors in extension and advisory provision (public, private, civil society); much broadened support to rural communities (beyond technology and information sharing) including advice related to farm, organizational and business management; and facilitation and brokerage in rural development and value chains." This definition is in line with the concept of innovation systems in that it proposes advisory services that support a range of actors and address a breadth of problems.

To put it more simply, Leeuwis and Van de Ban (2004) proposed this definition: "Extension is a series of embedded communicative interventions that are meant, among others, to develop and/or induce innovations which supposedly help to resolve (usually multi-actor) problematic situations." This definition provides more flexibility in that it does not specify the services to be provided or their objectives. However, this definition can be difficult to use when analyzing a complex extension system. Taking into account the latter point, and after exploring all these definitions, the European Union funded the PRO AKIS (Prospects for Farmer Support: Advisory Services in European AKIS) project. This endeavor assesses extension systems at the national level. PRO AKIS proposed this definition: "Agricultural advisory services are the entire set of organizations that will enable the farmers to co-produce farm-level solutions by establishing service relationships with advisors so as to produce knowledge and enhance skills" (Labarthe et al. 2013, 10). It should be noted that this definition continues the focus on farm- and production-level solutions.

Source: Compiled from Birner et al. (2009); Christoplos (2010); Sulaiman and Davis (2012); Leeuwis and van den Ban (2004); and Labarthe et al. (2013).

From a semantic point of view, within the international community the term "advisory service" is often preferred to "extension" because the latter mainly refers to a method for transferring knowledge. But in many cases, extension remains popular and has a more or less broad meaning. Indeed, some use the term "extension and advisory services." Other authors prefer to use the terms "communication" (Leeuwis and Van den Ban 2004) or "facilitative approach" (Ingram 2008) to emphasize the role of the facilitator in negotiations among different actors to solve problems. In this paper, we use the term "extension and advisory services," (EAS) and the definition of Global Forum for Rural Advisory Services (GFRAS) that appears in Box 1.1.

2. CONCEPTS OF AND DEBATES ABOUT INNOVATION SYSTEMS AND EXTENSION AND ADVISORY SERVICES

Extension and Advisory Services from an Innovation Systems Perspective

Within systems thinking, a portion of the scientific literature shows that EAS is one component of a much broader system. Innovation systems approaches were first described by scientists to analyze innovation processes and foster innovation policies in industrialized countries (Lundvall 1992; Freeman 1987). In the agricultural sector, the concept was used to address the complex nature of innovation and to go beyond the conventional linear innovation process paradigm (Biggs and Clay 1981). The well-known agricultural knowledge and information systems (AKIS) approach was coined by a Dutch research team (Röling and Engel 1990) to emphasize the interaction among research, extension, education, and farmers to produce knowledge and support innovation.

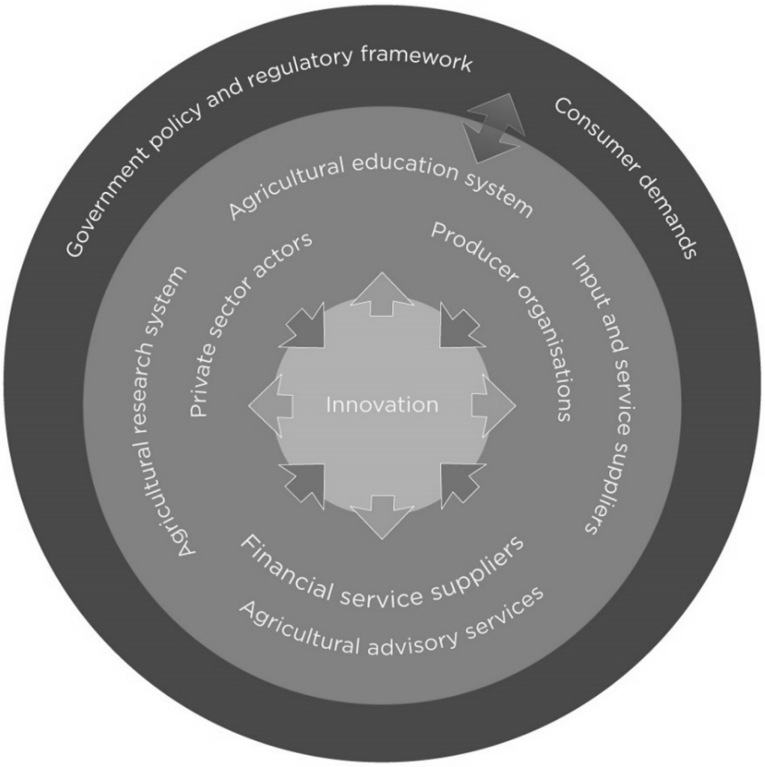
The agricultural innovation system (AIS) perspective was developed (Hall, Sulaiman, and Yoganand 2003; Klerkx, van Mierlo, and Leeuwis 2012) to more inclusively take into account the range of actors and networks contributing to innovation beyond the usual "knowledge infrastructure" (research, education, and extension). From the World Bank perspective (2012, 26) an "agricultural innovation system indicates a network of organizations, enterprises, and individuals focused on bringing new products, new processes, and new forms of organization into economic use, together with the institutions and policies that affect their behavior and performance."

The AIS approach highlights (1) the role of the institutional context in orienting the innovation process; (2) the importance of social networks; (3) the complex interactions among heterogeneous actors with the feedback loops endemic to an unpredictable innovation process, and (4) the importance of social and individual learning processes. Furthermore, the approach highlights several key aspects of the process of innovation. First, innovations are not only technical but also include social and institutional processes. Second, innovations do not originate only with research and new ideas be introduced by any actor within the system and the innovation is co-construction process. Finally, many iterations, feedback loops, and influencing factors (such as policies and regulations) affect the design and uptake of innovations.

As can be seen in Figure 2.1, innovation is a process that takes place through the efforts of a variety of actors within the innovation system (all the actors in the middle circle). Through their exchange (indicated by the arrows), innovation (the center circle) takes place. However, a crucial part of an agricultural innovation system is the policy environment, consumer demands, and the "rules of the game" that influence the interaction of these actors. The outer, darker circle depicts the policy component, while the arrows at that level indicate the interaction between the policy environment and the actors themselves in the middle circle.

EAS studies based on an innovation systems perspective help illuminate the relationship among actors, the role of networks in the innovation processes, and the function of service providers as a part of these networks and as supporters of rural actors. The literature provides guidance about how to better use the innovation systems framework when analyzing extension systems (for example, Klerkx, van Mierlo, and Leeuwis 2012; Rajalahti 2012). Some studies use the innovation systems framework to describe the extension system and to extract lessons. For instance, Ortiz et al. (2013) identified the components of the potato innovation systems in Bolivia, Ethiopia, Peru, and Uganda and the role played by actors (national and local government organizations, nongovernmental organizations (NGOs), private companies, farmers' organizations, and the media). Their research showed limited interaction among actors, which reduced farmer access to information, technologies, organizations, markets, and services. Other studies point out the emergence of different sets of service providers competing in the same territory. In Peru, Ortiz (2006) showed that the emergence of new actors using different approaches generated disarray in the "information system," owing to the lack of coherent policies to guide the interaction among actors. For example, he showed that the coexistence of different types of information about the control of potato pests promoted and used by diverse and usually unconnected sets of organizations (such as advisory service providers) and individuals presented a challenge to producers.

Figure 2.1 Depiction of actors, interactions, and institutions involved in innovation



Source: Authors' representation.

However, as pointed out by Touzard et al. (2014), many studies use the innovation system perspective to focus on only one part of the system. For instance, Friederichsen, Minh, and Hoffmann (2013) claimed using an AIS approach and analyzed the newly promoted pluralistic extension system in Vietnam and the ways in which public extensionists adapted their discourse and activities to this new situation. Spielman et al. (2011) focused on innovation networks in the agricultural sector in Ethiopia, and suggested that public extension and administration exert a strong influence over smallholder networks, potentially crowding out market-based and civil society actors and thus limiting beneficial innovation processes.

Within an agricultural innovation system, advisory service providers can complement each other to better support farmers or compete by providing divergent information to farmers. Providers have different goals, offer different types of services, and use different delivery and communication tools. Local and national context influences service providers, who are interdependent on other actors in the system in relation to various activities and interactions. This implies the following for EAS:

- An AIS approach broadens the scope of topics addressed by EAS beyond the usual support to agricultural production. To foster innovation capacities, EAS is also concerned with other topics such as access to market, natural resource management, health, and nutrition. Such an evolution is in line not only with a demand-driven extension perspective but also with the diversity of objectives that may be assigned to EAS by national agricultural policies (including improving food and nutrition security, alleviating poverty, and mitigating climate change).
- Farmers are no longer the only focus of advisory services because promoting innovation processes involves a multitude of actors interacting within networks. In regard to this perspective, one may argue that it could be more efficient to support other innovation

actors, such as agro-dealers or market traders, to have an impact on the livelihoods of farmers.

- The type of activities that EAS should undertake dramatically changes, and these new activities require the use of new advisory methods. In addition to their traditional role as subject matter specialists seeking to boost agricultural production, EAS may be asked to play a mediation role among parties (for example, farmers, inputs, suppliers, or traders) to foster innovation process. Debates focus on the need either to improve existing advisory services to fulfill this mediation role or to design a new kind of advisory service aimed at facilitating interactions among actors, as argued by Klerkx and Leeuwis (2008). These authors point out that traditional advisory services are often not capable of acting as mediators—or are not ideally placed to do this—because (1) they often focus on the technology of transfer; (2) their services are oriented by their own objectives; or (3) their advisors lack the necessary skills. Dedicated advisory service providers (brokers) can better fulfill this role in that they can more effectively match different service demands to advisory services suppliers.
- There is no clear boundary among actors included in an advisory services system and those included in an innovation system; each plays a complementary role. For example, different actors -be advisory services or not- could fulfill the mediator role at different points in the innovation trajectory. Thus it may be challenging to use an innovation system perspective to clearly identify EAS and to delineate the scope of research dealing with it. For this reason, the AKIS approach may remain a useful concept when analyzing complex extension systems because it mainly focuses on organizations such as advisory service providers and research organizations.

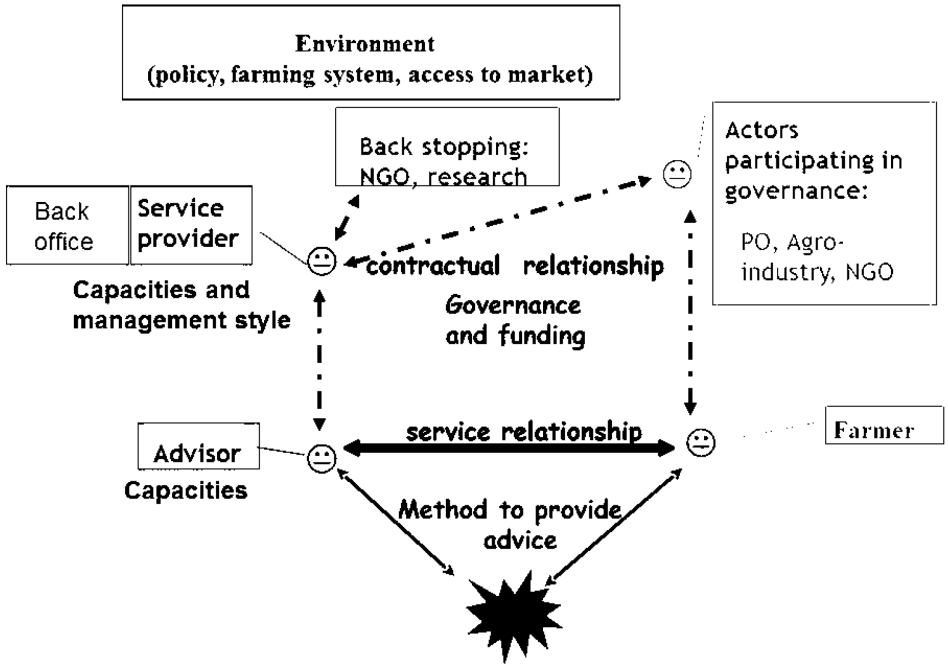
Some authors (Leeuwis and Van den Ban 2004; World Bank 2012) affirm that the future of advisory services no longer lies in a unified public service providing advice to farmers. Rather, it lies in a multi-institutional network that supports the creation of knowledge and learning processes through dedicated platforms. Such a systemic perspective raises the question of whether the alignment of services can support innovation processes. For instance, farmers and their organizations need to obtain not only different types of advice from different advisory service providers but also different types of services—such as credit or access to the market—at different points in the innovation process. As Spielman et al. (2011) point out in their study of Ethiopia, a systemic perspective also raises the need to better understand and support the social network of farmers and others in order to create knowledge useful for taking action. Finally, the issue of power relationships and asymmetry among actors arises; some actors may attempt to influence or constrain the innovation process to support their own interests.

Organization of Advisory Service Providers

The nature of the interaction between the advisor and the actor asking for advice is specific. In the context of the industrial world, Gadrey (1994) describes the interaction between the service provider and the client as a "service relationship" because although the advice is a co-construction between them, it is used by only one of them. Building on this approach, Labarthe (2009) points out the importance of identifying the characteristics of the organization providing advice. These qualities are shaped by the status of the organization, its source of funding (farmers, private firms, public sector, and the like), and its links with other actors. Moreover, Labarthe and Laurent (2013) define two different levels of knowledge production related to advisory activities. The first level is generated by the "front office," which is shaped by the service relationship and which produces knowledge and promotes learning through direct interactions between advisers and farmers. The second level is generated by the "back office," which corresponds to research-development activities (experiments, database management, and so forth) centered on the production and use of scientific knowledge. Back-office activities are inputs for co-producing advice with farmers while guaranteeing the validity of the advisors' expertise.

This thinking leads to the diagram in Figure 2.2, which depicts the actors providing the advisory service, the interactions among them, and the factors influencing the service. In addition, Figure 2.2 defines (1) a local level where the advice is provided; (2) a meso level where the service providers link to other actors (backstopping organizations that support the service providers, intermediary organizations that contract with them, and platforms that coordinate advisory services); and (3) a macro level where the institutional environment, which sets policy objectives for EAS and provides regulations and incentives, is located. We will use this thinking to comment on and add to the IFPRI best-fit framework (Birner et al. 2009).

Figure 2.2 Framework to analyze service relationship and influencing factors



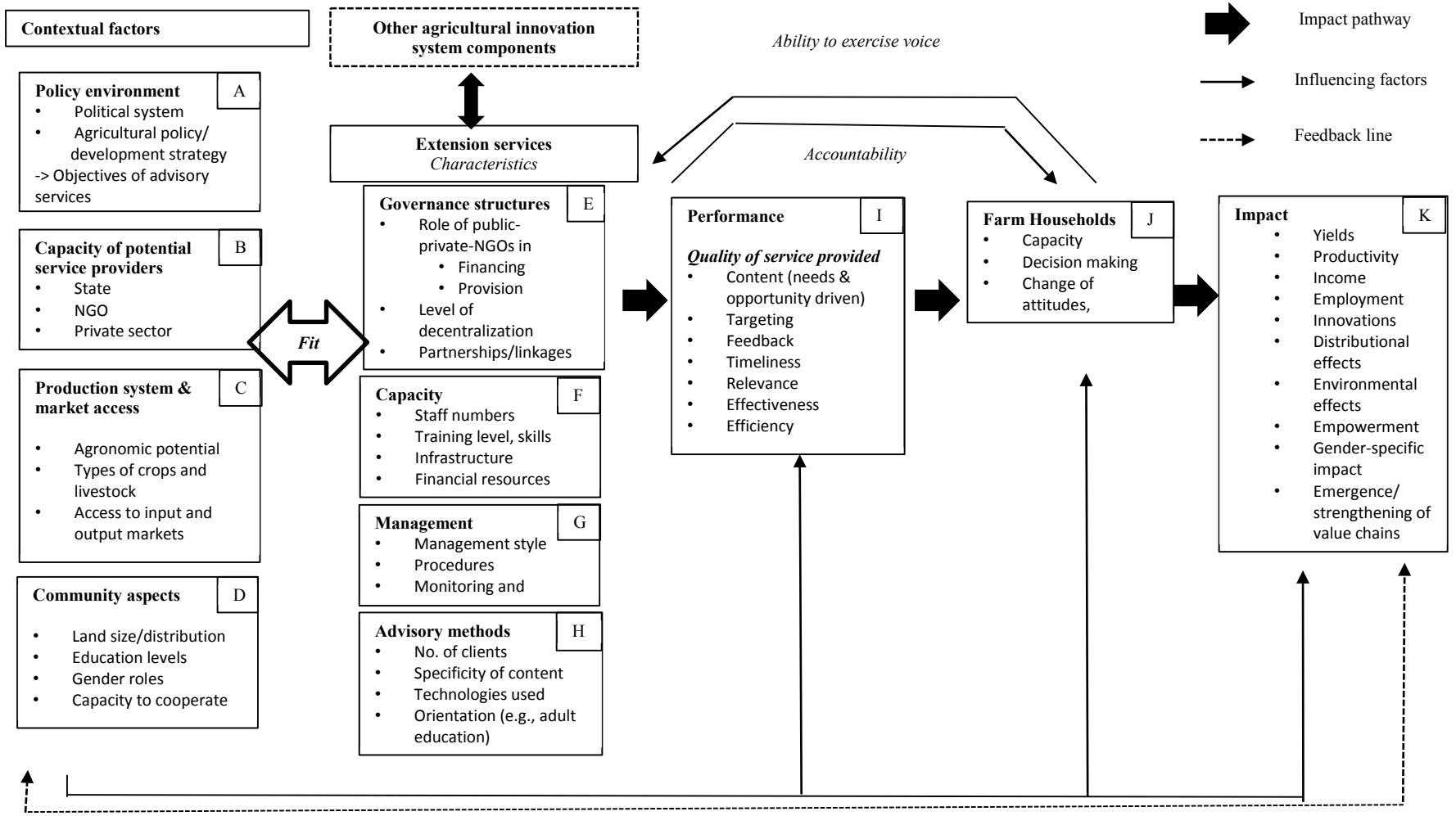
Source: Authors' representation from frameworks developed by Labarthe (2009); Faure, Rebuffel, and Violas (2011); and Gadrey (1994).

Notes: NGO = nongovernmental organization; PO = producer organization.

The Best-Fit Framework

Birner et al.'s seminal article (2009) presents a conceptual framework that can be applied as a best-fit solution to design advisory services. The framework can also be used to analyze the performance and impact of advisory services, depending on the local context (see Figure 2.3). Integrating insights from various social science disciplines, the framework also takes into account contextual factors ("frame conditions") affecting EAS. In addition, it establishes causal relationships among the characteristics of EAS, its organizational performance, its outcome at the farm household level, and, finally, its impact on development.

Figure 2.3 Framework for designing and analyzing advisory services



Source: Birner et al. (2006).
Notes: NGO = nongovernmental organization.

In Figure 2.3, boxes A, B, C, and D depict the contextual factors influencing EAS characteristics. The policy environment (box A) clearly shapes the context of EAS intervention by defining the agricultural development priorities at the national level and the budget (public or otherwise) dedicated to the agricultural sector, including extension. Swanson and Rajalahti (2010) point out that in many developing countries, public advisory services should be in line with four common policy orientations: achieving national food security, improving rural livelihoods, building social capital, and improving natural resource management. In the case of the European Union, the concept of "multi-functionality of agriculture" is recognized. This concept can be defined as the range of contributions of agriculture to rural development (Laurent 2001). According to its priorities, each country can assign a different task to EAS in order to focus on particular functions.

The capacity of potential service providers (box B) takes into account the degree of presence on the field, and the strengths and weaknesses of different types of providers. Each of these actors can orient, provide, and fund advisory services using numerous combinations, which depend on (1) who defines the rules for what and for whom, (2) who funds whom and how, and (3) who provides service to whom under which conditions.

Boxes C and D fully orient the type of advice provided based on the production systems and community aspects. Boxes E, F, G, and H characterize the EAS. As explained by Birner et al. (2009), the governance structures variables (box E) refer to the institutional setup of agricultural advisory services. Governance structures depend on the importance of the public sector, level of privatization, degree of decentralization, funding mechanisms and capacity of farmers to influence the EAS. Boxes F, G, and H focus on the service provider level by detailing (1) their capacities (human, financial, and physical assets); (2) management style, including planning, monitoring, and evaluation processes, which are largely influenced by governance structures; and (3) the advisory methods used. However the three boxes are not independent, they strongly interact (Faure, Rebuffel, and Violas 2011). For example, the capacities of the service provider influence the management style and the advisory method because certain methods require advisors with specific skills.

Boxes I, J, and K represent an impact chain that links EAS characteristics to performance and impact. According to Birner et al. (2009), the performance of EAS (box I) and the impact of EAS (box K) are two distinct categories. The indicators presented to assess the performance of EAS (box I) partially refer to the broad classification provided by the Organization for Economic Co-operation and Development (OECD 1998): relevance, efficiency, effectiveness, sustainability, and impact. Other indicators suggested include the quality of the service (time lines and equity, including gender equity) (Wellard et al. 2013).

As indicated by Birner et al. (2009), box J is key as it provides evidence about the client's use of services. Two categories of indicators are identified: those relating to the farmers' capacities and those relating to change of practices. However, one can also include change of attitudes or perceptions.

Box K assesses the impact of EAS with regard to the policy objectives that it was set up to achieve. Indicators may cover a large range of impacts, such as economic, social, and environmental. However, other actors may also have an interest in impact evaluation and may propose other indicators. Indicators are usually difficult to clearly identify due to the diversity of objectives, activities, and outputs of advisory activities.

3. KEY POINTS TO ANALYZE EXTENSION AND ADVISORY SERVICES TO IMPROVE THE BEST-FIT FRAMEWORK

This section outlines the key points of the best-fit framework to analyze the pluralistic EAS system as illustrated in Figure 2.3 (boxes E, F, G, and H). Based on a literature review, we will focus on governance structures, funding mechanisms, capacities of service providers, and methods/approaches to provide advice according to our framework regarding service relationships.

Governance Structures

This part discusses the box E of the best-fit framework (Figure 2.3). Countries have diverse governance structures shaped by their historical, institutional, and national contexts. Due to the poor efficiency of many public advisory providers, institutional reforms were enacted to improve EAS. This was done under the assumption that (1) the public sector should provide advisory services if the advice regards a public good, (2) the private sector should provide advisory services if the advice regards a private good, and (3) a third sector should provide advisory services using community-based approaches if the advice regards a common-pool resource (Birner et al. 2009). However, the reality is more complex because the distinction between public and private goods is ambiguous, both contractual and funding mechanisms between the two sectors are often complex, and the boundaries separating private, public, and third sectors are sometimes hard to draw.

Anderson and Feder (2004) argue that EAS can be improved when the system relies on a decentralized supply of advisory services and private providers. Rivera (2000) identifies strategies to cope with advisory services reforms: de-concentration with autonomous public local agencies, decentralization with agencies managed by local government, delegation of service to private providers acting under the supervision of the public sector; and pure privatization based on market rules. As emphasized by Rivera and Zijp (2002), the evolution of a privatized advisory system is not straightforward. It requires a precise clarification of the role of institutions, economic opportunities to finance advisory services, providers with adequate capacities, and farmers able to formulate clear demands.

Many authors mention the drawbacks of privatization, which can have negative consequences (Kidd et al. 2000; Labarthe 2005; Klerkx, De Grip, and Leeuwis 2006). These include limiting the dissemination of innovations that address the complexity of the production system, giving priority to the most profitable advisory activities, emphasizing technology transfer over the capacity building of producers, reducing exchanges between farmers who refuse to share information they bought, and favoring only those farmers able to afford advisory services. The desire for an expanded private sector requires a rethinking of the place and role of government and of private and public advisory services. Some authors (Anderson and Feder 2004; Rivera and Alex 2004; Swanson and Rajalahti 2010) believe that the public sector still has a role to play by providing advice in the most disadvantaged areas and to the poorest farmers. Finally, the privatization of advisory services implies that the government should develop new functions to regulate relationships among actors, and should guarantee that the public interests are considered (Klerkx, De Grip, and Leeuwis 2006; Labarthe 2005; Rivera and Alex 2004).

There is debate about the orientation of EAS beyond the role of addressing national priorities in the agricultural sector. Should advisory services be based on farmer demand, which could mean strengthening the capacities of farmers' organizations capacities to orient, fund, and provide advice? Farmers' interests are not necessarily in line with consumer demands or the interests of society as a whole, however. Addressing both farmers and public needs, requires the use of new intervention mechanisms by the public sector (pull measures to help farmers to ask for services and push measures to help advisory services to adapt their service provision), which are not yet fully understood and for which no best practice has been established (Klerkx and Jansen 2010). Should advisory services be oriented toward market requirements, which could mean giving more responsibilities and resources to upstream and downstream actors to undertake such a task? However, such private actors may not effectively

support farmers to adapt to their farming systems. In the case of the United States, Hoag (2005) emphasizes that citizens could help define the priorities of advisory activities to better meet the interests of society. In this case, the public sector strongly orients EAS because it represents the public interest. Azadi and Filson (2009) and Moumouni, Nouatin, and Baco (2011) underscore that, in many cases, national actors are not the most important players to orient EAS. This is because international donors have considerable influence in helping developing countries to define the part of the public sector to support, the topics to be addressed, and/or the technologies to be disseminated.

In fact, the new context of pluralistic extension makes it key to reassess the power relationships among the actors—and the resources they can mobilize—in order to identify those drivers that actually orient EAS.

Funding Mechanisms

This part also discusses the box E of the best-fit framework (Figure2.3). Funding mechanisms are one of the factors explaining or orienting the governance structure of advisory services. They constitute a crucial factor that must be fully analyzed and understood. A distinction must be drawn between the provision of services and funding for those services. Anderson and Feder (2004) and Birner et al. (2009) propose a useful typology based on who finances advice and who provides advice (Table 3.1). Privatization of advisory services is sometimes understood as a means for transferring the costs of services from the public sector to user groups. In fact, some private advisory organizations that have commercial relationships with farmers have indeed proven to be effective in facilitating intensive agriculture in developed countries and high added-value agriculture areas (Kidd et al. 2000). Nevertheless, it is generally recognized that the majority of family farmers—and not only those in developing countries—are unable to bear advisory costs on their own. Other authors, such as Moumouni (2006), add that farmers may not be willing to fund advisory services for diverse reasons. These include: (1) the advice does not meet their needs; (2) farmers consider information and training to be public goods that must be delivered for free; and (3) no clear relationship exists between the service and the results, and thus there are no clear incentives for buying advice. But mainly, the debate on the funding of advisory services revolves around possible funding mechanisms. In fact, the provision of advice by a public or private organization may be combined with public or private funds. One example is when the public sector subsidizes private providers, by means of direct funding or voucher systems, to deliver advisory services. In this case, the public sector defines the content. In another example, the private sector buys advisory services provided by the public sector to help farmers to produce and sell their products to private firms.

However, the reality is more complex, as Labarthe et al. (2013) demonstrate by providing a more detailed classification. First, there is a need to refine the service provider classification based on each national context. For example, the public sector could be represented by an advisory department of the ministry of agriculture, a local agency managed by a decentralized entity, or a research institute. The private sector would act differently, depending on whether it is an input supplier, an agro-processor, an independent consultant, or a large agricultural advice company. Farmers' organizations with small local groups or large cooperatives diverge in many ways.

Second, the funding mechanisms are more diverse, and usually a service provider is funded by a combination of funding sources. For example, a farmers' organization may receive funds from international donors to organize basic trainings for their members, negotiate levies with downstream actors to support farmers in their agricultural production, and collect complementary funds from their members to provide specific advisory services. Such a combination is a key element to improve the financial sustainability of service providers.

The question of the level of public funding to sustain EAS remains largely under debate. Because of the mixed nature of agricultural advice for public goods and private goods, public funding is key to maintain vivid EAS through different mechanisms such as competitive grants, voucher systems, and contractual arrangements with service providers. (See, for example, Beers and Geerling-Eiff [2014]) for a discussion of Dutch agriculture, which has different options to support innovation). Developing countries

face many urgent priorities related to infrastructure, health, and education; advisory services are not necessarily the highest priority, even if the food crisis changes priorities in the agricultural sector. Anderson and Feder (2004) indicate that many international donors are interested in funding EAS, but national governments are reluctant to finance them when the projects end. For instance, research conducted in Indonesia (Feder, Murgai, and Quizon 2004) or a recent analysis of 500 case studies (Waddington and White 2014) showed the difficulty of sustaining farmer field schools beyond project periods. Faure et al. (2013) identified the same difficulties for Management Advice for Family Farms experiences in West Africa.

Table 3.1 Funding mechanisms and advisory service providers

	Finance provider				
Service provider	**Public sector**	**Private sector: Farmers**	**Private sector: Companies**	**Third sector: NGOs**	**Third sector: FBOs**
Public sector	Public advisory services (different degrees of decentralization)	Fee-based public advisory services	Private companies contract staff from public advisory services	NGOs contract staff from public advisory services	FBOs contract staff from public advisory services
Private sector: Companies	Publicly funded contracts to private service providers	Private companies provide fee-based advisory services	Embedded services: Companies provide information when selling inputs or buying products	NGOs contract staff from private service providers	FBOs contract staff from private service providers
Third sector: NGOs	Publicly funded contracts to NGO providers	Advisory service staff hired by NGO, farmers pay fees	Private companies contract NGO staff to provide advisory services	NGOs hire own advisory staff and provide services free of charge	
Third sector: FBOs	Publicly funded contracts to FBO providers	Advisory service staff hired by FBO, farmers pay fees		NGOs fund advisory service staff employed by FBO	FBOs hire own advisory staff and provide free services to members

Source: Birner et al. (2009), adapted from Anderson and Feder (2004, 44).
Notes: FBO = Farmer-based organizations; NGO = nongovernmental organizations.

Capacities of Service Providers and Skills of Advisors

This part discusses the boxes F and G of the best-fit framework (Figure 2.3). Each service provider can be analyzed as an organization whose functioning depends on (1) the values, norms, rules, and routines shaped by members throughout the life of the organization; (2) the infrastructure of the organization and the resources, such as financial and human, that it can mobilize; and (3) the external context and the relationships the organization develop with other actors. There are diverse types of organizations. Some, which can be described as bureaucratic, have a rigid structure, a clear line of command from the top to the bottom, and a strict repartition of tasks among members. The Training and Visit system funded by the World Bank used to be based on bureaucratic organizations, and involved the administration of the ministries of agriculture (Benor, Harrison, and Baxter 1984). Large firms selling inputs may be classified in the same category. Other organizations are based on more democratic principles, valorizing the knowledge and initiatives of their members to better adapt advice to local conditions. For example, some

organizations (mainly NGOs) use participatory methods to define the tasks to be carried out by advisors and to adapt the activities to the demands of their clients or members. Members are expected to set the priorities of farmers' organizations through a democratic decision-making process and services better adapted to the needs of farmers. Some large advisory firms are based on an autonomous network of specialized advisors that plan their activities. In fact, many different organizational configurations exist. For example, some NGOs and farmers' organizations can operate as a bureaucratic entity. Despite an increasing number of actors are involved in the field of agricultural advisory services (public organizations, private companies, NGOs, farmers' organizations), there is little research that analyzes the functioning and performance of advisory service providers and the attendant consequences for service provision (Faure, Desjeux, and Gasselin 2011). However, studies have examined how pluralistic systems coordinate and self-organize. (See Kilelu, Klerkx, and Leeuwis [2013] on the coordination of services in Kenya, and Klerkx and Proctor [2013] on networks of advisors in England.)

In fact, to a large extent, the objectives pursued by service providers influence the nature of the advice they provide. For instance, private firms are increasingly implementing advisory services to promote their commercial activities. Some studies demonstrate that these firms can provide quality advisory services. Mirani, Bukhari, and Narejo (2007) present an example, drawing on chemical inputs delivery in Iran, as does Goulet (2011) in research on mechanized equipment for zero tillage in France. However, the advisory services provided by private firms are generally limited to improvement of agricultural practices and are mainly geared to larger farmers who are able to buy inputs or equipment. Due to more independent governance mechanisms, NGOs are usually associated with service provision more in line with the demands of rural communities. But many of these ONG could be driven by an ideological vision of the priorities necessary to achieve sustainable development, or by the willingness to disseminate preconceived technologies such as those related to agro-forestry or agro-ecology. The nature of advice is fully dependent on the funding mechanisms. Governments can contract private advisory service providers to support farmers, and thus define priorities in line with public policies and control outputs. This mechanism aims to improve the provision of advisory services through increased competition among services and more flexible funding, including possible cost-sharing among end users (Klerkx, De Grip, and Leeuwis 2006). Such a system may entail drawbacks. For example, Moumouni, Vodouhe, and Streiffeler (2009) show that private service providers (NGOs or farmers' organizations) are more accountable to international donors than to farmers because their funding depends on existing projects.

The quality of advisory services depends largely on the skills of advisors. In consequence, improving the managerial skills of service providers and their capacity to innovate with regard to advice provision is key. In an analysis of the advisor profession, Remy, Brives, and Lemery (2006) clearly illustrate the diversity and range of new knowledge and skills now required of agricultural advisors to manage concrete issues (production, management, administration, and so forth), as well as the interpersonal dimensions of advisory services. Referring to GFRAS work analyzing the evolution of EAS, Sulaiman and Davis (2012) talk about a "new extensionist" able to address a large range of recent challenges. Leeuwis and Van den Ban (2004) are more straightforward, arguing that the new job of advisor no longer aims at training farmers but strengthening innovation networks and supporting negotiations among heterogeneous actors. In fact, the debate focuses on two ways to address this evolution. The first is to extend the skills of advisors to deal with a broad spectrum of topics, while the second is to train highly qualified advisors to deal with specific topics. The literature (see, for example, Faure, Desjeux, and Gasselin 2012) shows that even in developing countries, there is a trend toward greater diversification of the advisory profession within a given geographical area. This trend involves the emergence of (1) highly specialized advisors to solve specific problems, working mainly in private organizations, and (2) advisors with more diversified skills who can support farmers in their individual or collective projects, working mainly for public organizations, NGOs, and farmers' organizations.

Another kind of advisor becoming increasingly important is the farmer extension worker, or farmer trainer (a farmer who acts as an advisor). These farmer trainers are supposedly more motivated and able to acquire farmers' confidence. In addition, their presence is perceived by many as a means to decrease the cost of advisory services and increase the number of farmers who can access advice (Franzel, Cooper, and Denning 2001; Wambugu, Place, and Franzel 2011). Farmer trainers have diverse profiles (literate or illiterate, volunteer or paid, and so on) and activities (collecting data, monitoring on-farm trials, acting as trainer, and the like). Noticeable successes have been cited by Lukuyu, Franzel, and Kiptot (2012); Wellard et al. (2013); and Kiptot and Franzel (2014). Yet, questions have been raised about the abilities of these farmer advisors to (1) address complex issues; (2) willingness to work on a voluntary basis; (3) risk to be distracted from their own farming activities; and (3) difficulties to implement support mechanisms beyond the phase of a particular project. In some countries, farmer trainers face negativity, skepticism, and even jealousy from their communities. These reactions are based on a long history of failed extension programs as well as an emphasis on master farmer schemes, model or progressive farmer approaches, or contact farmers under the World Bank's Training and Visit system (Knorr, Gerster-Bentaya, and Hoffmann 2007; Ragasa, Mazunda, and Kadzamira 2015).

However, even though the objectives pursued by the service provider determine advisors' activities, they always have room to maneuver to adapt their professional practices. For example, in the context of advisory service regarding livestock in France, Compagnone (2001) shows that the planning of activities depends more on the technicians than on instructions from the head management. The reason for this is that technicians feel more accountable to their clients, and in this way gain social recognition from both clients and their peers. Such a diagnosis demonstrates that job identity is important to orient service provision (see Albaladejo, Couix, and Barthe [2007] on France, Ingram [2008] on England, or Landini [2015] on Argentina). In the same vein, in Denmark, Andersen (2004) identifies different profiles of advisors who work for the same service provider. These include the specialist who delivers advice as an expert, the specialist who interacts with the producer to tailor his or her advice, and the advisor who listens to and interacts with the producer to construct the advice. However, little research has attempted to characterize interactions among different types of advisors working in the same geographical area in order to better understand the synergies or competition among them. For instance, Compagnone and Golé (2011) discuss advisors from different service providers competing or working together to address plant protection issues in France. In addition, Proctor et al. (2012) examine interaction between experts and the emergence of networks of practice in England.

Two intense debates surround the question of training advisors in developing countries to expand their knowledge and skills. The first debate is on the initial academic training of people dedicated to support rural development as advisors. Some think they should train generalists; others, specialists (see Davis et al. 2012). In South Africa, the debate is between the science-based Bachelor of Science degree and the more practically focused degrees from technology universities. In fact, national curricula in the schools and universities must be revised to better take into account the local realities and to improve the skills needed to support the capacity of rural actors to innovate (Christoplos 2010; Sulaiman and Davis 2012). The second debate is on improving advisors' capacity for reflection on their own professional activities. This can occur through better valorizing advisors' field experience, and supporting the networking activities of advisors to enable an exchange of experiences (Faure et al. 2013; Klerkx and Proctor 2013).

Methods and Approaches to Provide Advice

This part discusses the box H of the best-fit framework (Figure2.3). It is useful to distinguish between an advisory approach, which is a comprehensive framework for sharing knowledge with farmers and strengthening their skills, and advisory methods and tools, which are used by advisors to provide information and advice or to generate learning processes. The latter can be implemented through the use of different approaches by advisors. Advisory methods and tools can include both soft technologies (type of meeting, type of field visit, farmer trainers) and hard technologies (Information and Communications

Technology [ICT], including phone messages and flyers; Faure, Desjeux, and Gasselin 2012). Advisory methods and tools, which are being adapted continually and which lie at the heart of advisory services, have been the topic of numerous studies. The improvement of advisory methods and tools continues to drive debates on advisory services.

Two advisory approaches that have generated specific methods have been used in developing countries to ensure the dissemination of information and techniques, creating significant scientific output. One is the Training and Visit system approach first introduced in Turkey in 1975, followed by nearly 70 developing countries, under the impetus of the World Bank. Using this framework, advisors disseminate relatively simple technical messages validated through research to target farmers, known as "contact farmers," who then share their new knowledge with their neighbors. This technology transfer approach has been criticized largely because it does not sufficiently take into account farmers' needs and the capacities of local actors to innovate (Scoones and Thompson 2009).

The second advisory approach is the Farmer Field School approach, which was introduced in the 1980s in Indonesia and which spread through Asia and Africa, with particularly strong support from the FAO. Using this framework, advisors organize regular meetings with volunteer farmers, who acquire new skills and knowledge through field experiments and discussions between themselves and the advisor. The literature shows that the approach is part of the learning facilitation approach, which emphasizes the valorization of participants' experience and the reinforcement of their analytic skills (see, for example, Davis 2006; Anandajaysekerem et al. 2007). Drawing on literature reviews, Davis (2006), Davis et al. (2012), and Waddington and White (2014) emphasized the positive effect of the approach on participants (yield, incomes), but little to no effect on those who did not participate. Contributing to the intense debate on this method, Feder, Murgai, and Quizon (2004), after emphasizing the high cost of training sessions, questioned the economic viability of the system and recommended that the method be modified. In many countries, such experiences seem to end because the institutional and financial components of the approach have not been properly addressed.

Some researchers insist on the necessity of designing a whole farm advisory system to reinforce producers' capacities to manage their agricultural and non-agricultural activities, with a focus on a learning approach and the use of decision-support tools valorizing written material and book-keeping (Faure and Kleene 2004; Djamen et al. 2003). Dorward, Shepherd, and Galpin (2007) proposed a participatory farm management approach that uses technical-economic arguments for an illiterate audience. The authors showed that these methods, which promote self-analysis and exchanges among producers, reinforced the autonomy and decision-making capacities of farmers.

Some proposed advisory methods focus on farmer trainers (Lukuyu et al. 2012). Such approaches are strongly linked to the type of advisor and what she or he is capable of. Others focus on the means by which information is shared, such as new information and communication technologies (Ballantyne, 2009). For example, Chowdhury, Van Mele, and Hauser (2011) showed that video-mediated group learning enhanced women's ability to apply and experiment with seed technologies, stimulated reciprocal sharing of new knowledge, increased rice yields of plots tended by women, and increased rice self-sufficiency at the family level.

Aker (2011) analyzed the mechanisms through which ICT could facilitate the provision of advisory services in developing countries. Aker (2011) then reviewed existing programs that used ICT for agriculture, categorized by the mechanism (voice, text, Internet, and mobile money transfers) and the type of services provided (production, marketing, credit). However, Sulaiman and Davis (2012) suggest that ICTs in general have not contributed effectively to the challenge of putting new knowledge to use. This is because they are simply tools, mostly used to support traditional communication approaches such as information dissemination and training. Learning processes and networks are usually not sufficiently taken into account when promoting these new technologies. Moreover, during the design stage of developing decision support tools, it is important to take into account both uses and users if the tools are to fit the needs of farmers (Cerf and Meynard 2006).

Finally, the literature suggests that the promotion of new advisory approaches in developing countries is based more on the ability to design and implement one standard advisory approach than it is on a commitment to design and implement advisory approaches well-adapted to local conditions. The best-fit approach proposed by Birner et al. (2009) thus remains more of an objective than a reality. Since many approaches to provide advice exist, guidance is needed to identify which advisory approach best fits which objectives under which conditions.

We may propose a typology according to different objectives, such as knowledge transfer, decision support, problem solving, capacity strengthening, and coaching/mediation. The decision to use one approach over the other depends on the kind of problem the actors need to address (simple versus complex). This, in turn, orients the kind of solution they want (or are able) to implement (standardized versus co-constructed), more or less valorizing indigenous knowledge. Each approach entails a specific type of interaction (simple versus intense) between the advisor and the client/farmer. The number of farmers accessing advice (scaling-out issues) partially depends on this parameter (large audience versus restricted audience). Table 3.2 summarizes these elements.

Table 3.2 Diversity of advisory approaches according to diversity of objectives

Objectives	Approach	Key factors
Transfer of knowledge	Advisor tells farmer what to do	This method is relevant when (1) the problem and the solutions are known, and (2) the farmers are willing and able to use the advice offered. The topics are usually defined by external actors but are sometimes identified with inputs from local actors. The advice is standardized and focuses on individuals. The tools could include ICT, radio, television, newspapers, training, farm demonstrations, or some combination therein. The cost of the advice/farmer is relatively low. A large number of farmers can access advice.
Support for decision making	Advisor gives farmer options	This method is relevant when (1) the problem is known and various solutions are possible, depending on the situation of each farmer, and (2) the farmers are willing and able to use the advice offered. The topics are defined by external actors. The advice is differentiated and focuses on individual situations. The tools could include computerized models and simulation tools The cost of the advice/farmer depends on the decision support tools used. Many farmers can access advice.
Problem solving	Advisor supports learning processes to make farmers more autonomous	This method is relevant when the problem and the solutions are complex and unknown. The topics are defined by external and local actors, depending on the case. The diagnosis and the solutions are constructed by the farmers, who change their perception. The tools could include interactive training in the use of management tools. The cost of advice is high due to the training dimension. A limited number of people can access advice.
Support local initiatives and solve conflict	Advisor facilitates innovation processes and supports negotiations between stakeholders	This method is relevant when the problem and the solutions are complex and unknown, and involve various types of stakeholders. The topics are fully defined by local actors (demand-driven advice). The diagnosis and the solutions are constructed by the community, which changes its perceptions. The advisor plays the role of facilitator and intermediary. The tools could include shared diagnoses, project design by participants, and collective meetings. The cost of the advice may be high due to intensive exchanges among participants.

Source: Compiled by authors.

For each advisory service provider, the choice of the objective and corresponding methods depends on (1) the governance mechanisms that will orient the objectives of the service provider; (2) the capacities and skills of advisors (and their managers); and (3) the funding mechanisms (and availability of funding). In fact, advisors will select and mix different methods, depending on the problems they face, the available time they have to address the problem, and their personal profile.

Conclusion

Our analysis suggests that it is not the characteristics of each component of EAS (governance, funding, service provider capacities, advisory method) that explain its operation, but the interaction among components. Each component can evolve, depending on the context and decisions made by stakeholders. A change within one component generates changes in the others, especially in the "service relationship," and thus also changes the content and quality of advice. Finally, the EAS is a social construction that reflects the strategies of the actors, the resources they can access, and the constraints they face. Birner et al. (2009) describe such a situation with the expression, "from best practice to best fit."

4. LITERATURE REVIEW OF EVALUATIONS OF EXTENSION AND ADVISORY SERVICES TO ADD TO THE "BEST-FIT" FRAMEWORK

This section spells out methods and key considerations for evaluating a pluralistic EAS system, and provides suggestions to operationalize the best-fit framework based on an extensive literature review (boxes I, J, K).

Different Options for Evaluation

Although the topic of the evaluation of extension and advisory services is not a new one for research, it is receiving growing interest in the scientific arena and the development cooperation field (Faure, Desjeux, and Gasselin 2012). The debate is oriented largely by policy makers and donors who wish to evaluate the outcome of investments in EAS. For this reason, one of the most commonly used definitions of evaluation is that applied by the OECD (1998, 114), which states:

> Evaluation is the systematic and objective assessment of an on-going or completed project, program or policy, [and] its design, implementation and results. The aim is to determine the relevance and fulfilment of objectives, development efficiency, effectiveness, impact and sustainability. An evaluation should provide information that is credible and useful, enabling the incorporation of lessons learned into the decision-making process of both recipients and donors. Evaluation also refers to the process of determining the worth or significance of an activity, policy or program.

In fact, there are existing guides to designing and implementing an evaluation of EAS. Some were produced from 1999 to 2008 by a network of donors called the "Neuchatel Initiative."[1] Others include publications by the World Bank (Rajalahti, Woelcke, and Pehu 2005; Swanson and Rajalahti 2010; Rajalahti 2012) and FAO (Swanson 2008; Christoplos 2010). Finally, GFRAS produced a document guiding the evaluation of EAS (Christoplos, Sandison, and Chipeta 2012). The GFRAS document shows how complex this topic is. It underlines three points we consider important.

1. First, the objective of evaluation should be a balance between (1) addressing accountability issues by providing evidence to policy makers or donors to make decision about investments, and (2) the use of learning processes to build a shared diagnosis among stakeholders and help them to improve EAS. The two objectives are not easy to combine because the first is carried out mainly from an external standpoint, and the second is based mainly on participatory methodologies.
2. Second, monitoring, evaluation, and research play complementary roles. Monitoring is a pre-condition for evaluation. A common set of data needs to be systematically collected to inform the key evaluation criteria usually used in evaluation (relevance, efficiency, effectiveness, sustainability, and impact). Research contributes to the design of methods, and many evaluations are carried out by researchers to produce knowledge useful for policy makers.
3. Third, some evaluations are based on quantitative methods to provide evidence of impacts. Others are based on qualitative methods to aid understanding of the mechanisms that provide impacts. However, the complexity of the EAS system requires balancing qualitative and quantitative methods, and there are many different ways to carry out an evaluation. The particular focus of the evaluation determines which combination of methods is most appropriate.

[1] For more information see http://www.g-fras.org/en/knowledge/gfras-publications/neuchatel-initiative.html

However, the GFRAS document (Christoplos, Sandison, and Chipeta 2012) does not provide a framework to address the evaluation at the national or subnational levels, which must take into account the performance of the pluralistic EAS system, as well as its diverse set of providers and approaches and their impacts.

Berriet-Solliec, Labarthe, and Laurent (2014) help to further structure our reflections on methodological concepts. They address concerns related to evaluation goals, type of evidence, and levels of evidence. Regarding goals, they show that evaluation studies can be classified into three groups to:

1. *measure*: the evaluation analyzes the effects of a program with quantitative methods
2. *understand*: the evaluation identifies and analyzes the mechanisms by which the program under investigation can produce the expected outcomes or create adverse effects
3. *learn*: the evaluation is designed as a collective learning process to improve public decisions and actions

Regarding types of evidence, they delineate three types necessary to evaluate public policies:

1. *"evidence of presence"*: measuring things or facts stemming from implementation of the program
2. *"evidence of difference-making*": comparing the outcomes of a program to another situation
3. *"evidence of a mechanism for a phenomenon*": demonstrating a relationship between cause and effect, with a measure of the effects

Finally, they focus on the level of evidence because not all findings have the same probative force. They classified the level of evidence from the lowest to the highest quality:

1. opinion of respected authorities
2. evidence obtained from single-case observations
3. evidence obtained from historical or geographical comparisons
4. evidence obtained from cohort studies or controlled case studies
5. evidence obtained through randomized controlled trials (RCTs)

As Berriet-Solliec, Labarthe, and Laurent (2014) showed, no one evaluation methodology can be considered the gold standard for all situations. In theory, evaluations may combine different objectives, different types of evidence, and different levels of evidence. But some combinations raise methodological or cost issues, and it is important to look for the best fit when designing an evaluation of a complex EAS system.

Two main approaches are currently under debate. The first measures "evidence of difference-making," and uses cohort studies or RCTs. It may provide robust evidence when the problem is simple (for example, the impact of extension programs to disseminate fertilizer). But this approach faces drawbacks when addressing more complex issues. This is because the variables are interdependent (for instance, the impact of different types of extension programs to manage natural resources more effectively). Some authors underscore the importance of combining quantitative and qualitative analyses. They believe these are more capable of grasping the complexity of dynamics and establishing a causal link between the impacts measured and the methods implemented. For example, Godtland et al. (2004) evaluated the impact of a farmer field school program in Peru by mixing different type of analysis. Importantly, the authors note that such evaluations are both costly and complicated to conduct.

The second approach relates to the impact pathway methodology, which is based on "evidence of a mechanism for a phenomenon" and uses mainly case studies. The impact pathway method was first designed to carry out a project evaluation (Weiss 1995). It has been conceptualized by GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) and adopted by the CGIAR system (Douthwaite et al. 2003; Springer-Heinze et al. 2003) to address complex innovation processes involving research by considering a high degree of non-linearity. In this case, the method takes into account out-scaling and up-scaling processes. The first step of this approach is to describe an impact pathway, which is an explicit

theory or model of change to achieve impact. The second stage involves an ex-post impact assessment, wherein the evaluator seeks to establish plausible links among program inputs, program outputs, and developmental changes (outcomes and impacts). In some cases, the theory of change is not identified ex-ante but is analyzed only ex-post. Based on a constructivist approach, the impact pathway faces some drawbacks, such as different possible interpretations and, many times, low levels of evidence.

In some ways, there is room to combine the impact pathway approach with quantitative analysis. For example, Wellard et al. (2013) analyzed in three African countries the performance (efficiency, effectiveness, equity, sustainability, and replicability) and impact of community extension on food security for smallholders' farmers and the potential for scale-up. The methodology drew on surveys of farmers and interviews with extensionists and other local actors to identify the key indicators of outputs (number of trainings, level of participation, and so forth), and the main outcomes/impacts (adoption of technologies, number of months with food, and changes in livelihoods). Results were measured by comparing the outcomes of randomly selected participants and non-participants. The surveys aimed at collecting evidence of facts, declarations of changes for the main criteria, and scoring of changes in livelihoods since project inception. The efficiency of the whole program was estimated through a cost-benefit analysis at the regional level.

The level of stakeholders' participation in each category of evaluation is largely under debate (see, for example, Christoplos et al. [2012]; Berriet-Solliec et al. [2014]). If the first objective of the evaluation is learning, participation has to be a priority in the design of the methodology. In other cases, the degree of participation could vary greatly, from simply providing information or validating conclusions to better defining the objectives of the evaluation. These objectives include the data or information to be collected and analyzed, the selection and design of outcome and impact indicators, the study sites, and the research design and implementation.

Evaluation of Service Providers' Performance

This part discusses the box I of the best-fit framework (Figure2.3). Different analytic frameworks may be proposed to assess advisory service providers' performances by defining criteria based on effectiveness (achievement of objectives), efficiency (results obtained compared to resources invested), quality of services provided, equity of access to services, sustainability, autonomy of actors, and the like. The results of these assessments are mixed and depend on the context, the methods chosen, and the objectives of the evaluation. In fact, the majority of studies analyzing the performance of extension providers are carried out not by researchers but by experts as part of the evaluation of specific projects or programs funded by specific donors. Such studies focus on one type of service provider who benefits from external support or on one type of problem, which is addressed for one targeted social group. For example, Pound et al. (2011) analyzed several case studies illustrating the diversity of recent evaluations undertaken in developing countries regarding specific projects. All the studies combined different methods: a review of documents, interviews with key informants, focus groups, participatory workshops, customized questionnaires, and baseline surveys. In the same vein, Babu et al. (2012) examined the performance of the Agricultural Technology Management Agency in India with respect to its relevance and ability to reach farmers. The study showed how a public organization could build a private-public partnership with farmers' organizations and NGOs to provide advice to farmers through innovative mechanisms and to identify the many challenges to be addressed.

Research addressing the relationship between organizational issues and performance at the service provider level are not as numerous. Highlighting this gap of knowledge, Labarthe (2005) proposed an analytic framework inspired by service economics that helps to describe the production of innovations at the advisory service level. He observes five types of innovations involving advisory services, with a focus on (1) advisors' skills, (2) service provision methods, (3) information processing, (4) knowledge production and management, and (5) the interpersonal aspects of the advisor-client relationship. These types of innovations could be useful to identify key indicators in assessing the performances of advisory services.

Comparing different advisory service providers within pluralistic advisory systems raises formidable methodological questions—notably when statistical tools are used. The few studies that exist use more qualitative approaches than quantitative approaches. In the United States, Lohr and Park (2003) used an econometric model to explain the differences observed among different advisory sources based on surveys of organic farmers. Labarthe (2005) draws on institutional economy to compare the cases of the Netherlands, Germany, and France. Mirani, Bukhari, and Narejo (2007) questioned farmers in Pakistan on their level of satisfaction in order to compare the advisory services of phytosanitary companies with those of the national advisory service system. Buadi, Anaman, and Kwarteng (2013) asked beneficiary farmers to assess with simple questions six main services provided by NGOs: information support, input supply, training, technology transfer, credit, and monitoring and evaluation of extension activities.

In conclusion, the lack of research dealing with the organizational issues faced by service providers and the evaluation of their performances raises questions about how to (1) adequately assess and compare the performances of different providers, and (2) elaborate on recommendations to efficiently strengthen their capacity to innovate.

Evaluation of Impacts of Extension and Advisory Services

Beyond evaluating the performance of advisory services, it is important to assess their impact. Our evaluation distinguishes between the impacts of these services at the farmers' capacity level and at the farming system level. This is important because the learning process may entail a change of perception or the acquisition of knowledge and skills at the farmer level that may or may not necessitate a change of practices (Brossier et al. 1995). Impacts beyond the farm level will also be examined to address scaling issues.

Impacts on Farmers' Capacities

This part discusses the box J of the best-fit framework (Figure 2.3). If farmers are considered as entrepreneurs, they need to embrace more "proactive" strategic thinking, possess a clear vision of their future, and have the capacity to develop and implement strategic actions adapted to their own objectives. Advisory services strengthen farmers' capacity to innovate through information dissemination and support of learning processes. Learning processes change the way farmers perceive their situation and their environment, make their decisions, and act. In fact, thinking, decision making, and action is not a linear process, and the three elements constantly interact because people learn in the course of action (Kolb 1984). Advisory services may help them reflect on their actions to improve the way they manage their activities. However, even if much research has been carried out on behavior and attitudes (see, for example, Meijer et al. 2015), studies of the impacts of EAS concentrate more on outputs of the learning process than on farmers' capacities.

While some studies have described the learning process in a given advisory situation, few have attempted to measure the impact of the EAS organization on these processes through a cause-and-effect relationship. A classic approach is to question participants about their acquired knowledge, as Hall et al. (2004) did in the United States with cattle farmers. In Australia, Cameron and Chamala (2004) followed an action research approach to assess the impact of an advisory service to enhance the managerial skills of farmers. They used synthetic indicators informed by data collected from farmers in the program. Other authors have sought to establish a link between learning processes supported by advisors and the impacts of these learning processes. For example, a study conducted in Australia (King, Gaffney, and Gunton 2001) showed the benefits of a participatory learning method (participatory action learning). This method was implemented with farmers' groups working on conservation agriculture. They analyzed lessons drawn from their own personal experiences. This technique improved the effectiveness of individual learning more than did traditional extension.

Some studies show that the degree of evolution of capacities depends on individual characteristics that relate to farmers' psychological profiles. De Romemont, Faure, and Macombe (2014) analyzed the learning processes involved in a management approach that provided advice to family farms in western Africa over a one-year period. Through technical and management training based on planning, follow-up, and evaluation tools, the approach enabled both literate and illiterate farmers to better understand their environment, assess their own resources and situation with "new eyes," and act differently in this environment. The level of proactivity increased for every participant. However, the level of proactivity before the training was also the main factor influencing the learning process: even before training, proactive farmers made changed more quickly and initiated more planned activities.

In conclusion, changes in farmers' capacities must be considered as a major outcome of advisory services. However, policy makers and donors are not always convinced of this because they are mainly interested in the impact of training on rural actors' livelihoods. They note that while such change may be a necessary condition to improve these livelihoods, it is not a sufficient condition.

Impacts of EAS on Agricultural Practices, Yields, and Incomes

This part discusses the box J and K of the best-fit framework (Figure2.3). Evaluating the impacts of advisory services on agricultural practices and yields is an old tradition. Econometric approaches are widely used, and the use of experimental methods based on randomized control trials has increased. Most impact measurements focus on a limited number of criteria, often quantitative in nature, such as changes in agricultural practices. Examples include: (1) Nisha and Rakhesh (2006), who integrated pest management with farmer field schools and looked at crop yield variations in India; (2) Maffioli et al. (2011), who focused on grape-wine yield under public extension in Argentina; (3) Cavatassi et al. (2011), who explored potato crops in Ecuador; (4) Wanjala and Muradian (2013), who assessed the impact of the Millennium Village Project and variation in farm incomes in Kenya; (5) Davis et al. 2012, who focused on farmer field schools and variation in incomes ; (6) Akobundu et al. (2004), who investigated the incomes variation in the United States; and (7) Ragasa, Mazunda, and Kadzamira 2015, who investigated the evolution of food security. Rate of return is often assessed to compare the costs of extension services with the benefits they generate by promoting technologies. This analysis was conducted one by Marsh, Pennell, and Linder (2004) in Australia with the dissemination of a new species of Lupin; by Duflo, Kremer, and Robinson (2008) in Kenya with the diffusion of fertilizers; by Benin et al. (2011) in Uganda in the case of the National Agricultural Advisory Services; and by Venu et al. (2013) in India in the case of the Agricultural Technology Management Agency.

Beyond these examples, several meta-reviews analyze such results to draw out more general conclusions about the impacts on extension services. They note that important methodological questions remain unanswered, limiting the use of such impact analysis. A meta-review of 500 documents on farmer field schools projects (Waddington and White 2014) found that just some of them changed practices and raised yield. Birkhaeuser, Everson, and Feder (1991) assessed 48 case studies; 36 of them presented a significant and positive extension effect. They showed that

> "while there is convincing evidence that extension efforts can have a significant effect on outputs, there is limited evidence regarding the profitability of investments in extension from a social welfare perspective. Nonetheless, the few studies that were undertaken demonstrate that investment in extension can have a very high rate of return in both developing and developed countries. Given the limited number of such studies, it was not possible to establish empirically the circumstances that are conducive to extension effectiveness" (Berkhaeuser, Everson, and Feder, 645).

In addition, they pointed out the limits of such studies due to the quality of data. But they also noted the complex nature of extension, which limits the implementation of rigorous methodologies. Nearly 10 years later, Alston et al. (2000) analyzed 289 case studies. They found that the median economic rate of return to agricultural research and extension is 58 percent for extension investments, 49 percent for research, and 39 percent for combined investments in research and extension. By analyzing

empirical studies related to extension and quoting Alston et al. (2000), Anderson and Feder (2004, 55) underlined the following:

> "Although economic analysis seems to provide fairly strong justification for many past extension investments, it does not tell the full story. Concern about data quality and difficult methodological issues of causality and quantification of benefits must be important qualifiers to prevailing evidence of good economic returns from extension. In Kenya, perhaps the most closely studied case in developing areas, early evaluation had indicated remarkably high positive economic returns to extension investments, but a comprehensive evaluation based on new and improved data found disappointing performance, an ineffective, inefficient, and unsustainable training and visit system, and no measurable impact on farmer efficiency or crop productivity."

Based on 27 studies, Aker (2011) compared different types of extensions (farmer field schools, training and visit, farmer-to-farmer, social networks, and general extension) to outcome variables (knowledge, technology adoption, yield variation, rate of return). The author pointed out that the results provide contradictory evidence of the impact of agricultural extension programs. She explains that such variation of results and the lack of reliable conclusions are related mainly to methodological issues. Taye (2013, 1) analyzed 10 evaluations at the country level in Africa and indicated that most of the evaluations reported positive impacts. There are also conflicting reports on extension performance. The fact that the overwhelming majority of impact evaluation reports claim positive extension impacts is not in line with the reports on agricultural productivity growth in the region. There are various reasons for overestimated impacts and contradictory results, which include use of poor impact evaluation methodologies, lack of reliable data, and insufficient capacity to conduct rigorous impact evaluations.

Another problem is selection bias, which is the tendency to choose successful extension initiatives for assessment. The meta-review of farmer field schools mentioned above (Waddington and White 2014) addressed the impact of projects beyond the farm level by concluding that such projects have not been effective in addressing scale-out issues. The researchers also concluded that field school projects are unlikely to be cost-effective in comparison to other approaches. Although farmer field schools may be a more cost-effective way of empowering the poor, there is insufficient evidence on empowerment impacts to say definitively that this is the case.

In conclusion, the large majority of impact evaluations show positive impacts of EAS. However, they have yielded highly variable results and perhaps have overestimated the impacts, considering the persistently slow productivity growth in the agricultural sector in many developing countries. All the studies raise questions about the quality of the data and address methodological issues affected by the complexity of the EAS to be analyzed (Martin et al. 2011). Such impact evaluations consider the service providers as a black box, without providing a clear analysis of the link between the type of advice or method to provide advice and the impacts. For this reason, the results are useful to assess the investments made in EAS, but less so in providing recommendations to service providers and policy makers seeking to improve EAS. Due to these limitations, many studies use mixed quantitative methods and statistical analysis (for example, farm-level surveys) and qualitative methods (such as focus group discussions). Finally, the literature review shows the lack of research on the impacts of a whole national or subnational EAS system, with the diversity of providers giving different types of advice to different types of farmers (Christoplos 2012).

Impacts beyond the Farm

This part discusses the box K of the best-fit framework (Figure2.3). Evaluation of the impact of EAS on the dissemination of knowledge, techniques, and skills beyond the farmers who directly benefit from advisory services is rare. However, research in sociology has long highlighted the importance of the diffusion phenomena in rural areas, which depend on the producers' profiles and type of innovation (Rogers 1983) or the configuration of social networks (Darré 1996). German, Mowo, and Kingamkono (2006) argue that there are a few studies analyzing the impacts of technologies dissemination, and thus

present a more encompassing methodology for tracking the fate of technologies after interventions are completed. Such a methodology mixes comprehensive inquiry to identify the uptake of technologies by farmers with on-farm interviews and focus groups. Using an econometric approach, Feder, Murgai, and Quinzon (2004) showed that, in the framework of a farmer field school project in Indonesia, information on phytosanitary risk management was not disseminated to non-participant farmers within the villages. They concluded that diffusion and spillover was weak.

Technology dissemination is a complex problem. Simple innovation such as agricultural practices can be adopted by farmers, as they can exchange information with trained farmers and experiment on their own farms. More complex innovations such as adoption of new management methods rely on more complex learning processes, which need specific external support. For example, in the case of management advice for family farms in Benin, Rouchouse et al. (2014) showed that most participants learned management skills, which led them to reassess their objectives and modify their management and social practices. Even in the case of frequent communication, non-participants found it difficult to learn new management skills because they did not experience a full learning process. Non-participants consequently had difficulty understanding why participants adopted new management and social practices.

Scaling issues matter when talking about EAS: many advisory services find it difficult to involve a larger number of farmers and to address the sustainability of advisory mechanisms beyond the project phases. Scale-out mechanisms can be understood at the geographical level, with the spread of knowledge and practices to an increasing number of users over the time. Scale-up mechanisms can be understood at the organizational level, with capacity-building practices within and across organizations and networks at local to national levels. Scaling-up can be accomplished by new players who may be involved in the innovation process (producers, communities, intermediaries, development structures, political actors, and so forth). Coordination among actors, new rules, and new policies can also support the scaling-up of innovation process (see Douthwaite et al. 2003; Millar and Connell 2009). Both mechanisms are needed to achieve widespread and significant systems change. In this sense, the change of scale is not merely a question of dissemination of knowledge or technology. Instead, it is a question of reproduction of the learning process, with multiple actors interacting at different levels and in different areas with their own objectives and perceptions. According to the International Institute of Rural Reconstruction (2000, 23), various conditions must be met to go to scale. These include adaptable technologies, local capacity building, effective management, strong partnerships, market development, policy support, and financial sustainability. However, the scaling issue is more of a concern for national and international agricultural research and extension organizations that wish to improve the impacts of a given technology or advisory method than a concern for many local actors. Wigboldus and Leeuwis (2013, 3) identify four strategies required to go to scale:

1. Uncomplicated or simple situations involving little uncertainty and disagreement may be suitable for what is called a “push approach”: We have something that we want to go to scale and will work hard to make that happen.
2. In more technically complicated situations, a “pull” approach may be a better fit: We seek to scale up and out that which we think will help us to achieve the future we envision.
3. A socially complicated situation may call for a “plant” approach: We have something we want to go to scale, but such scaling can only happen if we connect other factors and work with other (development) actors.
4. In situations that may involve what we call “wicked problems,” there is a lot of uncertainty and disagreement. In such situations, we want to opt for the “probe” approach: We have particular aspirations for the future, but are unsure about what scaling processes would be involved in moving toward that future.

Such an analysis demonstrate that scaling-out and scaling-up of EAS are far more than a question of human and financial resources available for advisory services. To go to scale, we need to think about redesigning all or part of the advisory system, including questions related to methods, competencies, governance, and funding.

In conclusion, this literature review shows that many studies have analyzed the evolution of EAS systems related to past and ongoing reforms, the performance and/or impacts of specific programs or projects supporting EAS, and particular delivery methods or communication tools. But few address both the evolution of the whole set of advisory service providers forming the EAS system and the way they interact and operate, their performance, and their impacts.

5. PROPOSED METHODOLOGY

Based on the literature review and key points we discussed regarding the best-fit framework described in this review, this section describes a simple methodology that the authors recommend to analyze a pluralistic EAS system at the national or subnational level. Such a methodology must take into account the complexity and diversity of providers, approaches, and clientele. The methodology includes five steps, summarized in Table 5.1.

Table 5.1 Summary of the proposed methodology of analyzing and evaluating pluralistic EAS

	Steps	Objectives	Scales of work	Methods	Operational results
1	**Typology of EAS systems**	- Characterize and map EAS systems - Identify their functions	National	- Inquiries/workshops with stakeholders	Map and typology of EAS systems
2	**Comparison design and case studies selection**	-Design the comparison between countries and case studies -Verify the suitability of chosen case studies regarding typologies and acceptance of structures to participate	Subnational	-Participative characterization -Participative selection	Typology of case studies
3	**Performance evaluation**	-Identify performance criteria -Build performance diagrams for each service provider -Measure and compare performance -Identify complementarities, duplications, or conflicting messages -Identify factors affecting performance	Selected organizations	- Focus group to choose indicators; -In-depth inquiries (3–5 case studies) with focus groups to validate performance diagrams and results	Service performance diagrams/grids; report on performance
4	**Impacts evaluation**	-Build general and detailed Impact Pathway diagrams -Measure impacts (economic and social, direct and indirect) using qualitative and quantitative methods -Compare service providers and approaches -Identify the most relevant methods and tools to support innovation	Farms, communities, value chains, rural organizations	-Participative assessment: focus group to choose indicators -In-depth inquiries (3–5 case studies) with focus groups to validate impact pathway diagrams and results	Impact diagrams; results on impact
5	**Comparative analysis and sharing of lessons**	-Draw lessons across case studies and across countries	Case study comparisons and cross-country learning	- Comparative analysis among countries - National and international workshops with key stakeholders to share and draw out lessons	List of best practices; roadmap and key messages for governments and donors

Source: Authors.
Notes: EAS = extension and advisory services.

The five steps of the methodology are as follows:

1. Mapping of EAS at the national level, and then in the selected regions/districts (geographical distribution of EAS, intensity, frequency). This could be used as a management tool for decision makers.
2. Developing a typology of the different EAS systems operating at the country level, and then in selected regions/districts. This typology would feature the main characteristics and mechanisms (governance, funding, capacities, methods) that influence service providers.
3. Selecting case studies to represent the diversity of EAS systems, of service providers and of innovation processes. This would be accomplished by using an impact pathway approach linking key outputs (information, training, platform, and so forth); outcomes (changes at the farm level); and identification of the main impacts on economic, social, environmental, and human assets.
4. Conducting an in-depth analysis of case studies to better quantify and characterize the main impacts identified.
5. Drawing lessons by comparing case studies using standard methods and sharing these lessons with key stakeholders and policy makers.

Step 1: Characterization of EAS Systems

To begin, a study has to be carried out to describe the national extension system, and then the system on a regional or district level. This may include several types of EAS systems and answer questions such as:

- What is the diversity of objectives for agricultural advisory services (for example, primary production, social cohesion, environment conservation, poverty alleviation, and food and nutrition security)?
- What is the diversity of institutional arrangements?
- What are the main funding mechanisms?
- What is the geographical distribution of EAS?
- What are the interactions, levels of competition, complementarities, and synergies among service providers? Are there conflicting messages? Are there redundancies in roles and activities?

We propose focusing on one specific region (or selected district) of the country to test the framework. A workshop can be held for key actors and policy makers involved in EAS. Its aims would be to validate the characterization, discuss and improve the methodology, and identify actors willing to carry out case studies. In some instances, national platforms for EAS already exist and can be mobilized for such a task.

Step 2: Typology of Service Providers, and Selection and Characterization of Case Studies

The evaluation depends largely on an analysis of case studies that illustrate the extent to which a service provider or a group of service providers has successfully supported a specific innovation process that has included different types of actors. A typology of service providers (public, private, and other sectors) can be designed that takes into account the different EAS systems that may exist within a country.

- The selection of case studies can be based on the type of:
- services providers (see the typology)
- problem to be addressed (simple or complex)

- target audience (smallholder farmers, agro-business farmers, producers' organizations, and multi-stakeholders)
- advisory approach (transfer of knowledge or technologies, and capacity development)
- advisory methods and learning tools (information and communications technology, farmer -to-farmer, farm management, and farmers' field school, among others)

Step 3: Evaluation of Performance of Advisory Service Providers

Each case study can be analyzed by using a common grid or set of indicators that include elements such as the history of the case study, the structure and resources of service providers, their activities and their outputs, and the identification of the main impacts.

Furthermore, the impact pathway method can be used to identify for each case study the relationship among the activities of the advisory service the outputs (technologies dissemination, new institutional arrangements, training, platform, and so forth), and the outcomes.

The case study could be carried out by one person or a group of people who are actors in the study (internal and participative assessment), assisted by a researcher/assistant.

The performance of the service providers can be assessed through a set of indicators related to main criteria such as effectiveness, efficiency, quality, equity (targeting), and sustainability. One aspect of the performance evaluation is taking into account the point of view of the service providers, the innovation actors, and the farmers. The indicators are to be identified by the stakeholders and measured through participatory surveys.

The following tools can be used and designed:

- A timeline diagram describing the actions undertaken by the service provider and the events influencing the activity of the service provider.
- A service performance grid (measuring effectiveness, efficiency, equity, relevance, sustainability).
- An impact pathway diagram showing the "locus of learning,"—the point at which interactions between advisors and farmers actually take place (situation where the learning process occurs), changes (in representations, knowledge, and practices) at the farm level, farmers' organizations level, supply chain level, and community level.

Step 4: Impact Evaluation of Advisory Services

The impacts are identified by using the impact pathway method. However, the clear identification and measure of the impacts need a specific effort. The impacts will be assessed at two levels:

- First level: impacts related to direct activities of advisors; the indicators can be chosen with the actors. Focus groups will be held to identify impact indicators that make sense for people and that are in line with the objectives of EAS at the national or subnational level. The measure of the indicators will be based mainly on declaration of changes that people have noticed and participatory scoring methods. Participants and non-participants will be compared, but not through a rigorous statistical method.
- Second level: impacts related to indirect activities of advisory services to address scaling out issues and spillover issues.

The indicators are related to economic impacts, such as yield, incomes, and food security; social impacts, such as inclusion of marginalized groups; environmental impacts, such as biodiversity and soil fertility; human capital, such as skills and behavior; and social capital, such as the capacity to innovate.

We can design various tools, including an impacts diagram, to quantify and visualize the different impacts (first and second level). Based on the case studies, one would be able to add the different impacts to obtain indicators at the national or subnational level.

Step 5: Drawing out Lessons and Elaborating Policy Recommendations

To begin, a cross-country and comparative analysis of the case studies can be conducted to draw lessons on: (1) the main impacts arising from pluralistic EAS; (2) the factors explaining differences in service providers' performance; and (3) specific local or national contexts explaining structures, performance, and impacts in each case study.

Subnational, national, and international workshops with key actors and policy makers can be held to share the lessons learned and to identify key recommendations. These include a more permanent system of monitoring EAS and different ways to better orient and support EAS providers, with public institutions in charge of EAS in focus countries and regions/districts.

Limits

Our proposal may have some methodological limitations. First, the delimitation and choice of case studies could prove to be difficult, and the conclusions would not be relevant if the sample is too small or not well justified. Second, the quality of the analysis of how EAS contributes to the impacts depends largely on the quality of the impact pathway construction and the identification of relevant outcomes. Third, aggregation of the case studies results on impacts at the national level must be carefully managed and checked against other methods.

6. CONCLUSION

The paper analyzes EAS by using the best-fit framework, which continues to be perceived as relevant because it is based on a holistic perspective and has an impact pathway orientation. It presents current thinking on the different components that explain the performances of EAS (governance and funding mechanisms, capacities of service providers, advisory methods). In addition, the paper highlights the need to better take into account the interactions among the components. It provides insights on the evaluation of performances of the service providers and the impacts at the farm level and beyond. It shows that just a few studies address both the evolution of the whole set of advisory service providers forming the EAS system and the way they interact and operate, their performance, and their impacts.

Strategic information on the performance and impact of pluralistic EAS systems is needed to support national policy makers and top managers of service providers. This can be obtained by answering such questions as: Which extension programs and approaches suit which needs under what circumstances? How do service providers and their messages complement, duplicate, or conflict with each other, and where are the gaps? How can performance and impact be monitored?

Based on our analysis we propose some key points to be addressed. These are geared to improve the best-fit framework and to devise an operational methodology to assess pluralistic EAS.

- Draw a clearer distinction between the national and the local levels when analyzing EAS. With regard to the national level, attention should be directed at the agricultural knowledge and information system used by the main EAS actors. In addition, it is important to understand the policies regarding EAS and innovation with regard to funding, training, norms, and rules. In relation to the local level, the focus should be on understanding the diversity and complexity of service providers who (1) pursue different objectives, and (2) provide complementary or contradictory advice to farmers using different advisory approaches and methods. A mapping of EAS at the national level and a characterization of service providers may help to shed light on this complexity and diversity.
- Take into account the interactions among the different components of the framework (governance, funding, capacities, and methods). The large diversity of combinations of the different components explains the unique situation of each service provider, and thus each requires best-fit solutions depending in their unique context. Such an analysis of the interactions should be carried out for each type of service provider
- Improve the analysis of the learning process and behavioral change—for example, the link among the provision of advice, the change in farmers' perceptions, the skills acquired during the learning process, and the change of practices (agricultural, managerial practice, or social practices) at different levels. The impact pathway methodology may be useful to identify the outputs of EAS and the chain of outcomes produced by these outputs.
- Improve the impact pathway analysis by identifying two levels to detail the participant and nonparticipant levels: (1) the direct impacts concerning the farmers directly involved in advisory activities and (2) the indirect impacts or spillover concerning the farmers not directly involved in advisory activities (see spillover, scaling out and scaling-up issues). The two levels of analysis emphasize the need to define the timeframe to be considered to measure the impacts (especially for long-term impacts).

The assessment of pluralistic EAS based on such a framework entails the design and use of a mix of qualitative and quantitative methods. The balance between both methods depends on the level of precision needed when measuring impacts and budget constraints. When assessing pluralistic EAS at the national or subnational level, we need to identify a set of case studies based on a mapping and typology of EAS. We propose to carry out an evaluation for each case study by using the same framework and

methods. Qualitative methods are better suited to analyze interactions among the different components of EAS (governance, funding, capacities, and methods), and to identify EAS outputs and characterize the chain of outcomes they produce. Qualitative methods may be used to identify a large range of impacts (monetary and non-monetary), and to measure impacts by using participatory multi-criteria tools. Quantitative methods are also well suited to measure impacts regarding the adoption of agricultural practices yield and incomes. Whatever combination of qualitative and quantitative methods are used, triangulation—using secondary data and surveys, interviews, and focus groups—is key to validating the results. Other key elements that should be taken into account are the need to design a method useful to decision makers and stakeholders involved in pluralistic EAS participatory evaluation, and to produce tools that support decision making. In conclusion, we suggest testing and refining the framework and the method by means of a few pilot studies in countries where research teams studying EAS are already in place.

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